

REMARKS

Applicants have amended their claims in order to facilitate and simplify proceedings in connection with the above-identified application. Specifically, claims 22-51 have been cancelled without prejudice or disclaimer.

Moreover, claims 1, 14 and 16 have been cancelled without prejudice or disclaimer and claims 52-54 respectively, substituted therefor. Thus, claims 52-54 are the sole independent claims in the application. Claims 52 and 53 are directed to a friction stir welding method, and claim 54 is directed to a manufacturing method of a vehicle structure body.

Claim 52 recites steps including preparing first and second members, each of these members having first and second plates substantially in parallel and a third plate connecting a midway of an end part of the first plate to an end part of the second plate, with the end part of the first plate of the first member projecting beyond the end part of the second part of the first member, and the end part of the first plate of the second member projecting beyond the end part of the second plate of the second member, thereby forming a space between end parts of the second plates of the first and second members when the first and second members abut each other. Claim 52 recites further processing steps of abutting the end parts of the first plates of the first and second members and inserting a rotary tool from the space formed between the end parts of the second plates of the first and second members to the abutting portion from an outer side of the second plates of the members, and carrying out friction stir welding of the abutting portion. Claim 52 goes on to recite that the rotary tool is pulled out to an outer side of the second plates of the first and second members, from this space formed between end parts of the second plates of the first and second members; and

recites arranging a fourth plate between the end parts of the second plates of the first and second members, at the space formed between these end parts, with friction stir welding of the fourth plate to the end parts of the second plates of the respective members being carried out. In connection with claim 52, note, for example, Figs. 9(A)-9(D) of Applicants' original disclosure.

Claim 53 recites similar processing steps to those recited in claim 52; and further recites that the friction stir welding of the fourth plate to end parts of the second plates of the first and second members forms an obtained structure and that a structure body is manufactured by positioning the first plates of the first and second members of the obtained structure at an outer face of the structure body.

Claim 54 recites similar processing steps to those recited in claims 52 and 53, and recites that in carrying out friction stir welding of the fourth plate to end parts of the second plates of the first and second members, an obtained structure is formed; and that the vehicle structure body is manufactured by positioning the first plates of the first and second members of the obtained structure at an outer face of the vehicle structure body.

Applicants have amended dependent claims previously considered in the above-identified application in light of newly added claims 52-54; and in light of claim 52, Applicants have cancelled claims 11-13 without prejudice or disclaimer.

In addition to claims 52-54, Applicants are adding new claim 55 to the application. Claim 55, dependent on claim 52, recites that the fourth plate includes a vertical portion extending toward the first plates of the first and second members when the fourth plate is positioned bridging the second

plates of the first and second members, the fourth plate being T-shaped.

Note, e.g., Figs. 9(B)-(D) of Applicants' original disclosure.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the prior art applied by the Examiner in rejecting claims in the Office Action mailed November 2, 2004, that is, the teachings of International (PCT) Patent Application Publication No. WO 95/26254 (Midling, et al), and Japanese Patent Document No. 2-246863 (Mochizuki, et al), under the provisions of 35 U.S.C. §102 and 35 U.S.C. §103.

It is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such friction stir welding method, or such method of manufacturing a vehicle structure body, or the (vehicle) structure formed by the method, as in the present claims, including, inter alia, the preparation of the first and second members which, when these members are abutted, form a space between the end parts of the second plates of the first and second members; inserting a rotary tool from this space formed between the end parts of the second plates of the first and second members from an outer side of the second plates of the first and second members and carrying out friction stir welding of the abutting portion to form substantially flat a face of the abutting portion; pulling out the rotary tool to the outer side of the second plates of the first and second members from this space formed between the end parts of the second plates of the first and second members, and arranging a fourth plate at this space and carrying out friction stir welding of the fourth plate to the end parts of the second plates

of the first and second members from the outer side of the second plates of the first and second members. Note each of claims 52-54.

As discussed further infra, according to the present invention both the welding (e.g., friction stir welding) of the first plates and of the second plates/fourth plate are carried out from one side of the members.

In addition, it is respectfully submitted that these references would have neither disclosed nor would have suggested such method as in the present claims, or such product formed, having features as discussed previously, and further including wherein a structure body, or vehicle structure body, is manufactured by positioning the first plates of the first and second members of the structure obtained by the friction stir welding at an outer face of the (vehicle) structure body. See claims 53 and 54.

Moreover, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested the other features of the present invention as recited in the remaining, dependent claims, having features as discussed previously, and further including (but not limited to) wherein the friction stir welding of the abutting portion is carried out under a condition where a backing plate is located adjacent the abutting portion (see claims 2, 15 and 17); and/or wherein the fourth plate is welded to a connection portion of the second plate and the third plate of at least one of the first and second members (see claim 3), particularly wherein this welding of the fourth plate and the connection portion is carried out by friction stir welding (see claim 4); and/or wherein each of the first and second members has a recessed portion and respective end portions of the fourth plate are overlapped to the respective recessed portions, with respective end portions

of the fourth plate being welded to the respective first and second members (see claim 5), this welding of the fourth plate and the connection portion being performed by friction stir welding (see claim 6); and/or wherein the fourth plate overlaps the recessed portion and abuts the end portion of the fourth plate to an end portion of the second plate of the first member, providing another abutting portion, with friction stir welding being performed at this another abutting portion (see claim 7); and/or wherein the third plate of the first member is substantially orthogonal to the first plate of the first member, with friction stir welding of the fourth plate and the connection portion being carried out by positioning the rotary tool in a range of an extension line in a thickness of the third plate (see claim 8).

According to the present invention, wherein the two members are prepared such that a space is formed between end parts of the second plates of the first and second members when the first plates of the first and second members abut each other to form an abutting portion, with friction stir welding being performed at this abutting portion to form substantially flat a face of the abutting portion; and a fourth plate is provided between the end parts of the second plates of the first and second members and, e.g., bridging the space between the second plates, friction stir welding at both sides of the members can be achieved from only one side of the members. Thus, there is no need to invert the members in order to weld both sides. Note, in particular, the paragraph bridging pages 11 and 12 of Applicants' specification.

In addition, a flat face can be provided at the abutting portion, especially through use of the recited backing plate, whereby a good appearance of the friction stir welded structure can be achieved so that the

exposed surface of the first plates of the first and second members can be used as an outer face of the structure, having a pleasing appearance.

Mochizuki, et al discloses a vehicle body structure 20 (see Fig. 1) constructed by assembling the appropriate number of window forming material 21 and wainscot panel forming material 22 as the side structure, roof forming material 23 and pole plate forming material 24 as the roof structure, and floor forming material 25 and side beam forming material 26 as an underframe respectively as occasion demands. This patent document discloses that the window part forming member 21 is provided protrusively with a receiving piece 21a for supporting the upper or lower edge of a window frame, side edges of the forming members 21-26 being placed facingly and their inner and outer parts being bonded by welding.

As indicated by Applicants, Mochizuki, et al. shows in Fig. 3, a member 28 arranged between abutted portions as a backing plate, and shows welding of hollow frame members. However, it is respectfully submitted that Mochizuki, et al does not disclose, nor would have suggested, preparation of the members, and the welding in which two faces of the hollow frame members are welded from one side of the hollow frame members.

It is respectfully submitted that in Mochizuki, et al, joint member 28 is welded to the projecting chips 27g and 27g, and this joint member 28 becomes the backing plate and also becomes reinforcing material. However, as indicated previously, it is respectfully submitted that Mochizuki, et al does not disclose, nor would have suggested, the welding of both sides of the hollow frame member from one side, and including use of the fourth plate as in the present claims, and advantages thereof.

Midling, et al discloses a method of friction stir welding based on a relative rubbing movement between a probe of harder material and members to be joined. This patent document discloses a probe 1 (note especially Fig. 3) having a bottom part 23 (shoulder) of the probe and an outer shape (configuration) of the applied pin 24, where the bottom part 23 exhibits a concave surface, while the outer surface of the pin 24 is provided with alternatively protruding and recessed parts along its longitudinal axis. See the last full paragraph on page 3 of this patent publication. Various structures being friction stir welded are shown in Figs. 5a-e and in the description in the paragraph bridging pages 5 and 6 of this document.

Either assuming, arguendo, that the teachings of Midling, et al were properly combinable with the teachings of Mochizuki, et al, such combined teachings would have neither disclosed nor would have suggested the preparation of the members and positioning thereof, enabling both sides of the members to be welded (e.g., friction stir welded) from only one side, both sides of the members being welded from this only one side, and advantages thereof in avoiding the need for inverting the structure to weld both the first and second plates of the first member to respective first and second plates of the second member.

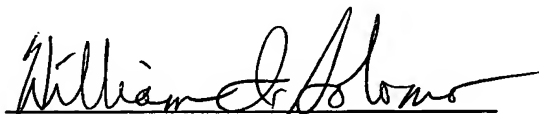
The contention by the Examiner that Midling, et al teaches inserting a rotary tool to the abutted portion from each side of the second plate, and carrying out a friction stir welding of the abutted portion, the Examiner pointing Fig. 5c of Midling, et al, is noted. It must be emphasized that Midling, et al shows friction stir welding of a solid plate; it is respectfully submitted that this reference does not disclose, nor would have suggested, either alone or in

combination with the teachings of Mochizuki, et al, the welding of first and second plates of one member to respective first and second plates of another member, from one side of the members, and advantages thereof.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently in the application are respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (Case No. 503.35255VX3) and please credit any excess fees to such deposit account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "William I. Solomon", written over a horizontal line.

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